

# Workplace exposure to Hexabromocyclododecane (HBCD) in the European Union

## Abstract

The aim of this study was to collect personal exposure concentration data to inform the EU risk assessment for the fire retardant Hexabromocyclododecane (HBCD). Six different industrial settings where HBCD exposure is possible were identified and two day measurement surveys were undertaken at 12 plants that were representative of these settings:

- Primary production (1 plant)
- Micronising (1 plant)
- Preparation of flame-retarded coatings for textiles (1 plant)
- Preparation of Masterbatch (1 plant)
- Production of flame-retarded expanded polystyrene (EPS- 4 plants)
- Production of flame-retarded extruded polystyrene (XPS - 4 plants)

Samples were collected using IOM sampling heads with foam inserts to allow the differentiation of the inhalable and respirable fractions of airborne dust. Samples were analysed by gravimetry and HPLC to determine the masses of dust and HBCD collected.

The measured exposure concentrations were generally low in comparison to UK exposure standards for respirable dust and inhalable dust. Only a small proportion of inhalable HBCD was within the respirable size range.

Micronising was associated with the highest personal exposure concentrations of HBCD with all measurements exceeding  $10 \text{ mgm}^{-3}$ . The plant has subsequently taken measures to reduce operator exposure. Other tasks associated with relatively high levels of exposure included the weighing out of HBCD prior to addition to EPS or during the production of Masterbatch, the addition of HBCD to the reaction vessel during production of EPS and handling of HBCD powder during the preparation of textile coatings. These tasks were of short duration such that shift mean exposure concentrations were generally well below  $10 \text{ mgm}^{-3}$ .

Workers engaged in the primary production of HBCD were not routinely exposed to high concentrations of HBCD and shift mean exposure concentrations were generally less than  $1 \text{ mgm}^{-3}$ . The production and processing of XPS was associated with very low concentrations of HBCD and shift mean exposure concentrations were generally less than  $0.1 \text{ mgm}^{-3}$ .

The personal exposure concentrations reported here are much higher than the long term mean exposure concentrations that would be typical for individual workers as workers rotated between tasks and/or only handled HBCD intermittently. In none of the workplaces visited, were workers likely to be repeatedly exposed on a large number of successive shifts to high concentrations of HBCD.